IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

POLAROID CORPORATION	)	
	)	
Plaintiff,	)	
	)	
v.	)	C.A. No. 06-738 (SLR)
	)	
HEWLETT-PACKARD COMPANY,	)	
	)	
Defendant.	)	

POLAROID'S REPLY BRIEF IN SUPPORT OF ITS MOTION FOR SUMMARY JUDGMENT THAT CLAIMS 1–3 OF U.S. PATENT NO. 4,829,381 ARE NOT OBVIOUS

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In opposition to Polaroid's motion for summary judgment of no obviousness, HP made three arguments: (1) Polaroid did not address all of HP's obviousness contentions; (2) Polaroid's evidence of no obviousness raises genuine issues of material facts; and (3) Polaroid's evidence of secondary considerations raises genuine issues of material facts. For the reasons stated below, each of these arguments fail. Therefore, summary judgment that Claims 1–3 are not obvious should be granted.

SUMMARY OF THE ARGUMENT

1. HP seeks to rely on contentions it did not disclose on the schedule set in the Amended Scheduling Order. Specifically, HP relies on opinions it first disclosed in an untimely supplemental expert report. Polaroid has moved to strike that report (D.I. 171). In addition, HP submitted another declaration that includes additional expert opinions never before disclosed to support its opposition to Polaroid's opening brief. *See* D.I. 190, at ¶¶ 6–21. Because these opinions are untimely, HP should not be able to rely on them to rebut summary judgment. *See Chimie v. PPG Industries, Inc.*, 402 F.3d 1371, 1374–75 (Fed. Cir. 2005) (excluding untimely evidence proffered to rebut summary judgment); *Anchor Wall Sys., Inc. v. Rockwood Retaining Walls, Inc.*, 340 F.3d 1298, 1313–14 (Fed. Cir. 2003) (finding no genuine issue of material fact for trial after striking expert declaration as untimely).

2. In any event, Polaroid rebutted all of the opinions HP belatedly produced to support its obviousness contentions. The Okada and Wang references are not invalidating. The Okada reference, alone or in combination with the other references HP identified, does not render Claims 1–3 obvious for at least the following reasons:

- The examiner allowed the '381 patent to issue over the Okada reference;
- Okada discloses a global correction system that transforms a video image by operating on ***the entire scene*** rather than on a pixel-by-pixel basis as in the '381 patent;

- Okada calculates a ***global average*** for the entire scene whereas the system claimed in the '381 patent only calculates a *local average* of a group of pixels near the pixel being transformed;

- Okada calculates ***one gamma value*** for the entire image whereas the '381 patent calculates a different gamma for each pixel in an image; and

- The gamma disclosed in Okada will be ***constant*** for certain ranges of the calculated global average for the scene and the system claimed in the '381 patent calculates a unique gamma for each calculated average value.

See D.I. 193, Polaroid's Answering Brief to HP's Motion for Summary Judgment, Or in the Alternative, Patent Invalidity at 31–36.

HP relies upon the Wang reference for its recitation of the technique disclosed in the Lee reference. The Wang reference, alone or in combination with other references does not invalidate Claims 1–3 for the same reasons that the Lee reference does not:

- Wang teaches a gain-based approach to image enhancement and not a power-law transformation claimed in the '381 patent;

- The function that transforms an input signal taught in Wang does not utilize the local average to select a unique gamma curve for each pixel like the function claimed in the '381 patent; and

- Wang teaches linear gray level stretching to enhance the pixels in an image whereas the '381 patent relies on a non-linear transformation that is able to increase the stretch in areas of very low light or very high light.

See D.I. 149, at 10–11, 37–38.

3. Notwithstanding the argument in its opposition brief, HP did not contend that the Iida reference, either alone or in combination with any other references, rendered Claims 1–3 obvious under Polaroid's construction. Therefore, Polaroid was not required to address any arguments with respect to that reference in its opening brief. Moreover, HP did not disclose the Iida reference until after the deadline for opening expert reports. But even if HP had timely

disclosed Iida in accordance with the Amended Scheduling Order, the Iida reference does not invalidate Claims 1–3 for at least the following reasons:

- Iida discloses that its system relies on preset values of gammas stored in memory, which the user can select via a joystick or by depressing different keys or combination of keys on a keyboard. The '381 patent calculates a gamma without the use of joysticks or keyboards;

- Iida does not teach a specific function for determining gamma whereas the '381 patent claims a specific function that makes use of the local average to determine gamma;

- Iida determines one gamma for an entire image and the '381 patent calculates a gamma for each pixel in an image, with the maximum number of gammas being 256 for an 8-bit image; and

- Iida will either improve contrast in low intensity areas or high intensity areas but not both. The '381 patent claims a system that is designed to improve contrast in both high and low intensity areas within the same image.

4. HP did not raise any issues of material fact with respect to whether Claims 1–3 are rendered obvious by the combinations of prior art it timely disclosed. HP's sole contention in response to Polaroid's motion is the unsupported (and unsupportable) legal conclusion of its expert, Dr. Rangayyan. *See Innogenetics, N.V. v. Abbott Labs*, 512 F.3d 1363, 1373 (Fed. Cir. 2008) (holding that "there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness".); *see also KSR Int'l Co. v. Teleflex Inc.*, --- U.S. --, 127 S. Ct. 1727, 1741 (2007) ("To facilitate review, this analysis should be made explicit.") (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Because an expert's opinion on the ultimate legal conclusion of obviousness is not "factual" evidence, HP fails to raise a genuine issue of material fact that requires trial. *SRI Intern., Inc. v. Advanced Tech. Labs., Inc.*, 45 F.3d 443, WL 712487, at *4 (Fed. Cir. 1994).

5. HP did not address Polaroid's evidence that the Sabri reference alone or in combination with the Gonzalez algorithm did not render Claims 1–3 obvious. Thus, Polaroid's motion on that point is uncontested and should be granted.

6. HP's attempt to rebut Polaroid's evidence of secondary considerations is nothing more than unsubstantiated attorney argument. A party cannot avoid summary judgment with attorney argument alone. *See Glaverbel Societe Anonyme v. Northlake Mktg. & Supply, Inc.*, 45 F.3d 1550, 1562 (Fed. Cir. 1995) (holding that attorney argument was insufficient to show that issues require trial).

ARGUMENT

HP does not raise any genuine issue of material fact that would preclude summary judgment that Claims 1–3 of the '381 patent are not obvious.[1] None of the three contentions HP makes to avoid summary judgment have merit. First, Polaroid refuted all of the arguments that HP attempts to use in support of its obviousness argument. Second, HP's contention that the record contains evidence that the combination of prior art that it has identified renders Claims 1–3 obvious is only supported by the conclusory statements of its expert and does not raise any genuine issues for trial. Third, HP's contention that there are genuine issues of fact regarding Polaroid's evidence of secondary considerations of non-obviousness is unsupported, attorney argument that is insufficient to rebut summary judgment.

[1] HP does not offer any evidence to rebut Polaroid's argument that summary judgment of non-obviousness of Claims 1–3 is appropriate in view of the Sabri reference alone or in combination with the Gonzalez algorithm. Compare D.I. 149 at 8, 13, 25–26, 36–37 with D.I. 188. Therefore, summary judgment that the Sabri reference, either alone or in combination with the Gonzalez algorithm, does not render Claims 1–3 obvious is appropriate.

A. HP Failed To Timely Disclose The Contentions On Which It Now Relies To Dispute Summary Judgment.

Courts have refused to consider information that a party produced after the court-ordered deadline to defeat summary judgment. *See, e.g., Chimie*, 402 F.3d at 1374–75 (excluding untimely evidence proffered to rebut summary judgment); *Anchor Wall Sys.,* 340 F.3d at 1313–14 (finding no genuine issue of material fact for trial after striking expert declarations as untimely); *see also Laymon v. Lobby House, Inc.*, C.A. No. 07-129-MPT, 2008 WL 1733354, *5 (D. Del. April 14, 2008) (holding that "[s]ummary judgment . . . looks only to admissible evidence."). HP attempts to rely on two types of opinions it did not disclose until after the deadline in the Amended Scheduling Order for such opinions: (1) the opinions first disclosed in Dr. Rangayyan's late Supplemental Expert Report; and (2) Dr. Rangayyan's new opinions about prior art that are contained in his declaration in support of HP's opposition brief. Polaroid has moved to preclude HP from relying on opinions in Dr. Rangayyan's supplemental expert report. *See* D.I. 171. HP should be precluded from relying on Dr. Rangayyan's declaration in support of HP's opposition brief for the same reasons.

As with the Okada reference, Dr. Rangayyan did not opine in his opening expert report that the Wang reference in combination with the identified references rendered Claims 1–3 obvious. Moreover, any opinions concerning the Wang reference in Dr. Rangayyan's supplemental expert report are subject to Polaroid's motion to preclude HP from relying on untimely discovery. *See* D.I. 171. Those untimely opinions with respect to the Wang reference are also subject to Polaroid's motion to exclude Dr. Rangayyan's opinions on obviousness because they are unreliable. *See* D.I. 170, Polaroid's *Daubert* Motion to Exclude Dr. Rangaraj Rangayyan's Opinions Concerning Obviousness at 2 n.1. Thus, Polaroid was not required to

address those opinions. *See Chimie*, 402 F.3d at 1374–75; *Anchor Wall Sys.*, 340 F.3d at 1313–14.

Similarly, Dr. Rangayyan did not identify the Iida reference in his opening expert report. And, in his untimely supplemental report, he only opines that Iida anticipates Claims 1–3. *See* D.I. 190, Ex. C, ¶¶ 150–55. Because HP disclosed its contentions with regard to each of these references after the court-ordered deadline, it cannot rely upon them to create a genuine issue of fact.

B. Even Assuming That HP Had Timely Disclosed Its Contentions, Polaroid Addressed Each Allegation, And None Have Merit.

The contentions that HP properly disclosed in Dr. Rangayyan's opening expert report do not raise any triable issues with respect to the Okada and Wang references that HP claim were omitted from Polaroid's opening brief. In his opening expert report, Dr. Rangayyan acknowledges that the '381 patent was allowed over Okada because it did not disclose the ratio requirement of the asserted claims:

> [T]he '381 patent appears to have been allowed by the patent examiner because Okada does not explicitly disclose . . . a ratio of the value of an average signal to a value proportionate of the dynamic range of the signals to generate the nonlinear transformation illustrated in Fig. 2 of the Okada patent and Fig. 2 of the '381 patent.

D.I. 190, Ex. A, ¶ 131. Nowhere in that report did Dr. Rangayyan opine that Okada alone or in combination with any of the identified references render the asserted claims obvious.

HP argues that it does not need Dr. Rangayyan's supplemental expert report to support its motion for summary judgment. *See* D.I. 188, HP's Opposition to Polaroid's Motion For Summary Judgment That Claims 1–3 of U.S. Patent No. 4,829,381 Are Not Obvious at 13 n.3. It contends that it can prove that the Okada reference renders the claims obvious by relying on the

prosecution history of the '381 patent, Polaroid's expert's statements about the disclosure in Okada, and Polaroid's claim construction. *Id.* HP is not permitted, however, to rely solely on the Okada reference and the prosecution history of the '381 patent to argue that Okada renders the claims obvious. *See Innogenetics*, 512 F.3d at 1373 (declining to find a genuine issue of material fact without credible expert testimony). That is because evidence about the patent-in-suit and the prior art reference is vague without expert testimony and is not helpful in avoiding the pitfalls of hindsight that belie a determination of obviousness. *See id.* (citing *Graham v. John Deere Co.*, 383 U.S. 1, 86 (1966)). In addition, HP cannot rely on statements made by Polaroid's expert because she made those statements in opposition to HP's motion and therefore, HP cannot rely on them to meet its burden on summary judgment.

Moreover, as Polaroid explained in its opposition to HP's motion for summary judgment of non-infringement, or in the alternative, patent invalidity, the Okada reference does not invalidate the asserted claims. *See* D.I. 193, at 31–36. The examiner allowed the '381 patent after analyzing the Okada reference. *See id.* at 34. Okada's system differs from the system claimed in the '381 patent in at least three ways. *First*, Okada teaches that the transformation of the video image must occur by analyzing the entire image and not each pixel of an image. *See id.* at 32. The '381 patent, on the other hand, transform images on a pixel-by-pixel basis. *Id.* *Second*, Okada only calculates a global average for the entire scene. *See id*. In contrast, the system claimed in the '381 patent only calculates a local average of a group of pixels near the pixel being transformed. *Id.* *Third*, Okada calculates one gamma value for the entire image. *See id.* In contrast, the '381 patent calculates a different gamma for each pixel in an image. Importantly, Okada does not teach a specific algorithm for calculating gamma. *Id.* at 33. And,

the algorithm it does teach for transforming a video scene differs fundamentally from that taught in the '381 patent to transform individual pixels in a scene. *See id.* at 36.

Even if Dr. Rangayyan were permitted to give opinions in his supplemental expert report, he did not conduct a proper obviousness analysis and his opinion that the Okada reference invalidates the asserted claims is conclusory.[2] An expert's opinion on the ultimate legal conclusion of obviousness is not "factual" evidence. *SRI Intern.*, 45 F.3d 443, WL 712487, at *4. Therefore, Dr. Rangayyan's ultimate conclusion that the Okada reference invalidates the '381 patent cannot raise a genuine issue of material fact.

In his opening expert report, Dr. Rangayyan did not contend that the Wang reference invalidated Claims 1–3. *See* D.I. 190, Ex. A, at ¶¶ 208, 222, 237, 237–243, 245–251, 253–258. And, his untimely supplemental expert report attempts to rely on opinions regarding how the Wang reference teaches the preamble and the first claim element of Claim 1 that do not exist. *See* D.I. 190, Ex. C, at ¶¶ 111, 115. Specifically, HP contends that Wang teaches the preamble of Claim 1 under Polaroid's claim construction and cites to paragraphs 205–216 in Dr. Rangayyan's opening report. *See* D.I. 190, Ex. C, at ¶ 111. Those paragraphs do not contain any opinions regarding the Wang reference. *See* D.I. 190, Ex. A, at ¶¶ 205–216. Similarly, HP contends that Wang teaches the first element of Claim 1 (means for averaging) under Polaroid's claim construction and cites to paragraphs 219–230 of Dr. Rangayyan's opening report. *See* D.I. 190, Ex. C, at ¶ 115. Those paragraphs do not contain any opinions regarding the Wang

[2] Polaroid has also moved to exclude Dr. Rangaraj Rangayyan's opinions concerning obviousness. *See* D.I. 170.

reference either. *See* D.I. 190, Ex. A, at ¶¶ 219–230. Thus, Dr. Rangayyan's supplemental expert report is insufficient to create a triable issue with respect to the Wang reference.

In any event, the Wang reference is a survey article. HP relies on it for its recitation of the teachings found in the Lee reference. Compare D.I. 190, Ex. A, at ¶¶ 172, 185, 195, 203 (Wang) *with* D.I. 190, Ex. A, at ¶¶ 212, 225, 249, 256 (Lee). Polaroid addressed the teachings of Lee in it's opening brief (D.I. 149). The Wang reference, alone or in combination with other references does not invalidate Claims 1–3 for the same reasons that the Lee reference does not:

- Wang teaches a gain-based approach to image enhancement and not a power-law transformation claimed in the '381 patent;
- The function that transforms an input signal taught in Wang does not utilize the local average to select a unique gamma curve for each pixel like the function claimed in the '381 patent; and
- Wang teaches linear gray level stretching to enhance the pixels in an image whereas the '381 patent relies on a non-linear transformation that is able to increase the stretch in areas of very low light or very high light.

See D.I. 149, at 10–11, 37–38.

HP disclosed its contentions regarding the Iida reference for the first time in Dr. Rangayyan's supplemental expert report. But even if HP's arguments regarding Iida had been timely, they would not be able to raise a genuine issue of material fact regarding whether Iida invalidates the claims. The Iida reference does not invalidate Claims 1–3 for at least the following reasons:

- Iida discloses that its system relies on preset values of gammas stored in memory, which the user can select via a joystick or by depressing different keys or combination of keys on a keyboard. The '381 patent does not utilize joysticks or keyboards to select gamma (*see* Ex. 1, Iida at col. 4, lines 62–66);

- Iida does not teach a specific function for determining gamma whereas the '381 patent claims a specific function that makes use of the local average to determine gamma (*see id.* at col. 4, lines 25–39);

- Iida determines one gamma for an entire image and the '381 patent calculates a gamma for each pixel in an image, with the maximum number of gammas being 256 for an 8-bit image (*see id.* at col. 4, lines 62–66); and

- Iida will either improve contrast in low intensity areas or high intensity areas but not both and the '381 patent claims a system that is designed to improve contrast in both high and low intensity areas within the same image (*see id.* at col. 5, lines 12–18).

HP's reliance on *Omegaflex, Inc. v. Parker-Hannifin Corp.*, 243 Fed. Appx. 592 (Fed. Cir. 2007) is misplaced. *See* D.I 188 at 13–14. In *Omegaflex*, the Federal Circuit reversed summary judgment because the trial court disregarded the non-movant's expert's testimony of why one of skill in the art would have been motivated to combine prior art references. *Omegaflex*, 243 Fed. Appx. at 596. In this case — unlike in *Omegaflex* — Dr. Rangayyan did not provide ***any reason*** for why one of skill in the art would combine any of the prior art references he identified. *See* D.I. 170 at 4–7.

The other cases on which HP relies are equally inapposite. For example, the court in *Medical Instrumentation. and Diagnostics Corporation v. Elekta AB*, 344 F.3d 1205 (Fed. Cir. 2003), reversed a grant of summary judgment because the non-movant's expert identified quotes from several prior art references that expressly discussed a motivation to combine references. *Id.* at 1222. In contrast, Dr. Rangayyan did not point to any evidence that one of skill in the art would be motivated to combine the references he identified. Rather, he provided the same conclusory statement without evidentiary support: "It is my opinion that combining the 'means for selecting and transforming' of the Gonzalez algorithm with the image processing systems and

methods described by [the prior art] is no more than arranging elements already well-known in the image processing field." *See, e.g.,* D.I. 190, Ex. A, ¶ 238; *see also* D.I. 170 at 4–5.

The court in *Miller Products Co. v. Veltek Associates*, Civ. A. 01-35-KAJ, 2004 WL 253473 (D. Del. Feb. 10, 2004) held that there were genuine issues of material fact that precluded summary judgment of validity on all grounds because the movant only addressed evidence of obviousness and did not address the non-movant's evidence of on-sale bar and anticipation. *Id.* at *5. Here, Polaroid is only moving for summary judgment of non-obviousness and properly addressed each obviousness contention.

Eaton Corporation v. ZF Meritor LLC, 504 F. Supp. 2d 217 (E.D. Mich. 2007), cited by HP supports Polaroid. In *Eaton Corp.*, the court granted summary judgment in favor of the party with the expert opinion that comported with the well-established principles of obviousness law under § 103, including *Graham*, 383 U.S. at 86, and *KSR International*, 127 S. Ct. at 1727. *See Eaton Corp.*, 504 F. Supp. 2d at 224. In this case, Dr. Agouris, Polaroid's expert, provided evidence of each *Graham* factor. HP's expert witness did not.

C. HP's Unsupported, Conclusory Contentions are Insufficient To Rebut Polaroid's Motion For Summary Judgment.

HP cannot properly rely on its expert's vague and conclusory statements — unsupported by any analysis — to raise genuine issues of material fact on obviousness. The ultimate conclusion of obviousness is a question of law. *Eli Lilly and Co. v. Zenith Goldline Pharms., Inc.*, 471 F.3d 1369, 1377 (Fed. Cir. 2006). An expert's opinion on the ultimate legal conclusion of obviousness is not "factual" evidence. *SRI Intern., Inc.*, 45 F.3d 443, WL 712487, at *4. Although the parties' experts disagree on the conclusion of obviousness, "conflicting opinions on a legal issue *vel non* raise no issue of fact." *Id.*

Polaroid's expert, Dr. Agouris, explained why the disclosure of each reference combined with the knowledge of one skilled in the art would not render the claims obvious. For example, Dr. Agouris explained in detail why there is no apparent reason to combine the teachings of the Gonzalez text with the Gonzalez algorithm if the desired outcome was the invention claimed in the '381 patent. *See* D.I. 151, Ex. C, at 36–37. Dr. Agouris also described the results of combining the Gonzalez text with the Gonzalez algorithm and explained how the results are far different than the '381 patent's invention. *See id.* at 37.

In contrast, HP's expert, Dr. Rangayyan, merely stated that the prior art references taught each claim element and concluded that this renders the claims obvious. *See* D.I. 190, Ex. A, at ¶¶ 204–243. He did not address why one of skill in the art would make the proposed combinations. He also did not address how one of skill in the art would combine the teachings of the references, which are each trying to solve different problems from each other and from the '381 patent. *See* D.I. 170. Consequently, his opinion on the legal conclusion of obvious is the kind of opinion that is not "factual" evidence under *SRI International*.

1. HP has not established — and cannot demonstrate — its burden of establishing a reason to combine, and summary judgment of non-obviousness is appropriate for this reason alone.

The sole evidence on which HP relies to raise a genuine issue of material fact — Dr. Rangayyan's opinions — is deficient because he fails to articulate any reason or conduct any analysis to support his legal conclusion of obviousness. *See Innogenetics, N.V.*, 512 F.3d at 1373 (holding that "there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness".); *see also KSR Int'l*, 127 S. Ct. at 1741 ("To facilitate review, this analysis should be made explicit.") (citing *In re Kahn*, 441 F.3d at 988).

For Claims 1–3, Dr. Rangayyan merely recites that the prior art he identified teaches each element of the claims. He then repeatedly concludes "[the combination of references] is no more than arranging elements already well-known in the image processing field." *See*, *e.g.*, D.I. 190, Ex. A, ¶¶ 238–43. The law requires more. Even assuming that each element of Claims 1–3 were found in multiple prior art references — which they are not, as Dr. Agouris explains — the Supreme Court recently confirmed that "a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art." *KSR*, 127 S. Ct. at 1741. "[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *Id.*

Nevertheless, Dr. Rangayyan fails to articulate any reason why a person of ordinary skill in the art would combine any particular references. At his deposition, Dr. Rangayyan testified that he did not render an opinion on the motivation to combine references: "[my analysis as to a motivation to combine] could be left open." *See* D.I. 170 at 6. Because HP has not established — and cannot demonstrate — any reason to combine, for this reason alone, summary judgment of non-obviousness is appropriate.

In addition, HP's contentions are the kind of litigation-inspired hindsight "analysis" the Supreme Court has found to be unpersuasive. For example, in *Graham*, the Supreme Court emphasized the "importance of guarding against hindsight . . . and resist[ing] the temptation to read into the prior art the teachings of the invention in issue" when considering the obviousness of a patent. *Graham v. John Deere Co.*, 383 U.S. at 86. Other courts have likewise warned against the use of hindsight. *See, e.g., Innogenetics, N.V.*, 512 F.3d at 1374 n.3. The court in

Innogenetics warned that "[w]e must still be careful not to allow hindsight reconstruction of references to reach the claimed invention without any explanation as to how or why the references would be combined to produce the claimed invention." *Id.*

For each combination of references, Dr. Rangayyan uses hindsight to conclude that the proposed combination of references teach the following algorithm claimed in the '381 patent:

$$Y_{OUT} = 255*(\frac{Yin}{255})^{(1+C)^{(Av/M-1)}},$$

where Y_{OUT} is the new pixel value, Y_{IN} is the original pixel value, C and M are constants, and A_v is the local mean. Below are the algorithms disclosed in each reference that HP identified:

Prior Art Reference	**Gonzalez Algorithm**
Gonzalez: $g=A*(f - m) + m$, where $A = k*\frac{M}{\sigma}$. g is the new pixel value, f is the original pixel value, m is the gray-level mean, k is a constant between 0 and 1, M is the global mean, and σ is the gray-level standard deviation.	FLEV = FH * EXP(-ALOG((FH/T)/32)*(32-I)) + 0.5 FLEV = new pixel value, FH is the maximum gray value in image, T is either the minimum gray value in image or 1, depending on which is greater. I is the original pixel value. ALOG means take the antilogarithm of the entity in parentheses.
Richard: $Y' = Y * (M_v/M_g) * k$ Y′ is the new pixel value, Y is the original pixel value, M_v is the local mean, M_g is the global mean, and k is a constant.	
Lee: $x' = m + k * (x - m)$ x′ is the new pixel value, m is the local mean, k is a constant, and x is the original pixel value.	

Prior Art Reference	**Gonzalez Algorithm**
Rangayyan: $p' = a * (1+\sqrt{(\lvert p - a \rvert / (p + a))}) / (1-\sqrt{(\lvert p - a \rvert / (p + a))}$, if $p \geq a$ and $p' = A_v * (1-\sqrt{(\lvert p - a \rvert / (p + a))}) / (1+\sqrt{(\lvert p - a \rvert / (p + a))}$, if $p < A_v$ p' is the new pixel value, a is the average value of pixels surround p, and p is the original pixel value.	
Chen: $I' = G(x) * (I - \bar{I}) + \bar{I}$ I' is the new pixel value, G(x) is a transfer function, I is the new pixel value and $\bar{I}$ is the mean value of pixels.	
Narendra: $\hat{I} = \alpha(\frac{M}{\sigma}) * (I - M_{ij}) + M_{ij}$ $\hat{I}$ is the new pixel value, α is a gain factor, M is the global mean, I is the original pixel value, and M_{ij} is the local mean.	

As shown, none even remotely resembles the algorithm claimed in the '381 patent. Nevertheless, not only does HP fail to put forth a shred of evidence of how one of skill in the art would combine these algorithms with the Gonzalez algorithm (which are directed to different problems), HP also fails to offer evidence of how one of skill in the art would reach the algorithm in the '381 patent after the combination.[3] Even if it had been timely produced,

[3] HP attempts to correct the deficiency in Dr. Rangayyan's expert reports by submitting an affidavit to explain the motivation to combine the references he identified. *See* D.I. 190 at ¶¶ 6-21. Just as with the opinions contained in Dr. Rangayyan's Supplemental Expert Report, these opinions are untimely and should be excluded. *See* D.I. 171.

Dr. Rangayyan's affidavit —submitted with HP's opposition brief— that a person of ordinary skill in the art would be able to modify any algorithm or combine it with a different algorithm to come up with a third algorithm is unsupported. *See* D.I 190, ¶¶ 9–12. Dr. Rangayyan does not provide any evidence for such a conclusory statement and does not explain how one of skill in the art in 1988 could do so. In contrast, Polaroid explains why a person would not look to the Gonzalez algorithm to create an adaptive contrast enhancement scheme like that taught in the '381 patent. *See* D.I. 149 at 9, 16, 33–39. Polaroid also explained in detail why the combination of references would not result in the invention claimed in the '381 patent. *See id.*

In addition to failing to follow the legal standards for obviousness, HP mischaracterizes the disclosures contained in several references. For example, HP's argument that the Gonzalez algorithm "disclose[s] a contrast enhancement scheme" is in direct contradiction to the teachings of the Gonzalez algorithm and the Gonzalez text. *See* D.I. 188,at 16; *see also* D.I. 149 at 9, 16. In addition, HP cannot dispute that the Gonzalez text does not teach the use of power law functions (which later editions of the same text do). *See* D.I. 188,at 17; *see also* D.I. 149 at 33.

HP's belated argument that a skilled artisan would look to Richard to achieve the invention of the '381 patent because the primary purpose of the Richard reference is to enhance contrast in an image ignores the language of that reference. *Id.*; D.I. 190, at ¶ 6. Richard expressly teaches that its invention is "particularly advantageous for processing images which are highly affected by noise." *See* D.I. 189, Ex. D, col. 1, lines 35–39; D.I. 149, at 22, 34. The invention of the '381 patent is not directed to improving images "highly affected by noise" and there is no evidence that one of skill in the art would combine Richard with a subroutine for printing images on a line printer to reach the invention claimed in the '381 patent. *See id.*

HP mischaracterizes Polaroid's argument regarding Narendra as being based solely on the disclosure of a recursive filter. *See* D.I. 188, at 27, 28. Polaroid's evidence that Narendra combined with the Gonzalez algorithm does not invalidate the claims, however, focuses on the non-recursive algorithm taught in Narendra. *See* D.I. 149 at 13–14.

HP's attempt to rebut Polaroid's evidence that one would not look to the Rangayyan reference when trying to achieve the invention claimed in the '381 patent (because the purpose and result of the technique disclosed in the Rangayyan reference is the exact opposite as to what is achieved with the invention of the '381 patent) is not persuasive. *See* D.I. 188, at 24.

First, HP's contention that the goal of the Rangayyan reference should not be considered is legally unsupportable. *See id.*, n.7. The first step of the obviousness analysis is to determine the scope and content of the prior art. *See KSR*, 127 S. t. at 1734. A necessary component of this analysis is whether the prior art reference is within the field of the endeavor of the patent at issue. *In re Kahn*, 441 F.3d at 986–87. To determine whether the Rangayyan reference is within the field of endeavor of the '381 patent, the goal of the reference must be considered. *Id.*

Second, HP cannot rebut Polaroid's evidence with Dr. Rangayyan's untimely opinion that one would be motivated to combine the Rangayyan reference because it teaches "adaptive contrast enhancement generally." The Rangayyan reference only discloses a "simple enhancement function" and not the complex power-law function claimed in the patent. *See* D.I. 189, Ex. J, at 561. In addition, the Rangayyan reference concentrates on how to implement adaptive neighborhoods so that dark images in x-rays will appear darker and light images in x-rays will appear lighter. *See id.* This is in direct contrast to the teachings of the '381 patent.

None of the cases cited by HP in footnote 7 of its brief concern the scope and content of the prior art or a motivation to combine references. *See Merck & Co. v. Biocraft Labs.*, 874 F.2d 804, 807–809 (Fed. Cir. 1989) (analyzing whether claim element was found in prior art); *In re Heck*, 699 F.2d 1331, 1332–33 (Fed. Cir. 1983) (analyzing whether claim element was found in prior art); *Upsher-Smith Labs. v. Pamlab, LLC*, 412 F.3d 1319, 1323 (Fed. Cir. 2005) (analyzing issues of anticipation); *Celeritas Techs. Ltd. v. Rockwell Intl'l Corp.*, 150 F.3d 1354, 1361 (Fed. Cir. 1998) (analyzing issues of anticipation).

Moreover, the case law that HP cites to support its argument that issues where the experts disagree should go to the jury are also distinguishable. *Goss International Americas, Inc. v. MAN Roland, Inc.*, Civ. No. 03-CV-513-SM, 2008 WL 879762 (March 28, 2008) supports Polaroid. The court in *Goss* held that summary judgment of non-obviousness is only available if there are no genuine issues as to any material fact relating to the *Graham* inquiry. *Goss*, 2008 WL 879672, at *1. In this case, Polaroid put forth evidence with respect to each Graham factor: 1) the scope and content of the prior art; 2) the differences between the art and the claims at issue; 3) the level of ordinary skill in the art; and 4) objective evidence of non-obviousness. *See KSR*, 127 S. Ct. at 1734; *see also* D.I. 149 at 16–39. HP did not conduct a *Graham* analysis.[4] Instead, HP began its analysis of each reference with a statement that the combination of prior art

[4] As with its lack of evidence on a motivation to combine references, HP attempts to correct its deficiency with respect to the scope and content of the prior art in Dr. Rangayyan's expert reports by submitting an affidavit to explain why one of skill in the art would look to the references it identified. *See* D.I. 190 at ¶¶ 6, 14–21. Just as with the opinions contained in Dr. Rangayyan's Supplemental Expert Report, these opinions are untimely and should be excluded. *See* D.I. 171.

references teach each element of the claims. *See* D.I. 180 at 15, 18, 21, 23, 25, 26. Thus, there is no genuine issue as to any material fact relating to the *Graham* inquiry and for this reason alone, summary judgment should be granted.

Amesbury Group , which was decided before *KSR* did not analyze the issue of whether an expert conducted the proper analysis and provided sufficient evidence to rebut summary judgment. *See Amesbury Group*, 2006 WL 3196747, at *6. Similarly, *IXYS Corporation* is pre-*KSR*. *IXYS Corp.*, 321 F. Supp. 2d at 1133. It did not address the sufficiency of the expert's analysis. *Id.* at 1147–48. Similarly, *In re Fulton*, 391 F.3d 1195 (Fed. Cir. 2004), did not concern competing expert testimony at all. Rather, the court analyzed whether the Board of Patent Appeals and Interferences properly held that a patent was obvious. *Fulton*, 391 F.3d at 1196.

HP's reliance on *DyStar Textilfarben GmbH & Co. Deutscheland KG v. C.H. Patrick Co.*, 464 F.3d 1356 (Fed. Cir. 2006) is also misplaced. *See* D.I. 188, at 20–21. The court in *DyStar* was not evaluating summary judgment motions and did not hold that conflicting expert opinions require that summary judgment should be denied. *DyStar*, 464 F.3d at 1360–61.

2. HP failed to rebut Polaroid's secondary indicia of non-obviousness.

HP's only contention in response to Polaroid's evidence of secondary considerations of non-obviousness is unsubstantiated attorney argument. A movant cannot meet its burden that a trial is appropriate based solely on attorney argument. *See Glaverbel*, 45 F.3d at 1562 (holding that attorney argument was insufficient to show that issues require trial).

HP relies on disclosures in the prior art references it identified as invalidating to rebut Polaroid's evidence of long-felt demand and a failure to solve by others. *See* D.I. 188 at 29.

Yet, HP has not identified a single reference that was directed to the problem that the inventors of the '381 patent were trying to solve. "Whether the evidence presented suffices to rebut the prima facie case is part of the ultimate conclusion of obviousness and is therefore a question of law." *Tec Air, Inc. v. Denso Mfg. Michigan, Inc.*, 192 F.3d 1353, 1360 (Fed. Cir. 1999) (citing *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)). And as explained earlier, an expert's opinion on an ultimate legal conclusion is not "factual" evidence and cannot rebut summary judgment. *See SRI Intern., Inc.*, 45 F.3d 443, WL 712487, at *4.

CONCLUSION

For the reasons stated herein, and in Polaroid's opening brief, summary judgment that Claims 1–3 are not invalid for obviousness should be granted.

* * *

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June 18, 2008

2370310

CERTIFICATE OF SERVICE

I, the undersigned, hereby certify that on June 18, 2008, I electronically filed the foregoing with the Clerk of the Court using CM/ECF, which will send notification of such filing(s) to the following:

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Exhibit 1

United States Patent [19] [11] **4,394,688**

Iida et al. [45] **Jul. 19, 1983**

[54] **VIDEO SYSTEM HAVING AN ADJUSTABLE DIGITAL GAMMA CORRECTION FOR CONTRAST ENHANCEMENT**

[75] Inventors: **Hitoshi Iida**, Bedford; **Pay-Shin King**, Newton, both of Mass.

[73] Assignee: **Hamamatsu Systems, Inc.**, Waltham, Mass.

[21] Appl. No.: **296,068**

[22] Filed: **Aug. 25, 1981**

[51] **Int. Cl.**³ **H04N 5/14; H04N 5/20**

[52] **U.S. Cl.** **358/160**; 358/164; 358/163; 358/166; 358/169; 382/54

[58] **Field of Search** 358/160, 163, 164, 166, 358/37, 168, 169, 903, 111; 364/515

[56] **References Cited**

U.S. PATENT DOCUMENTS

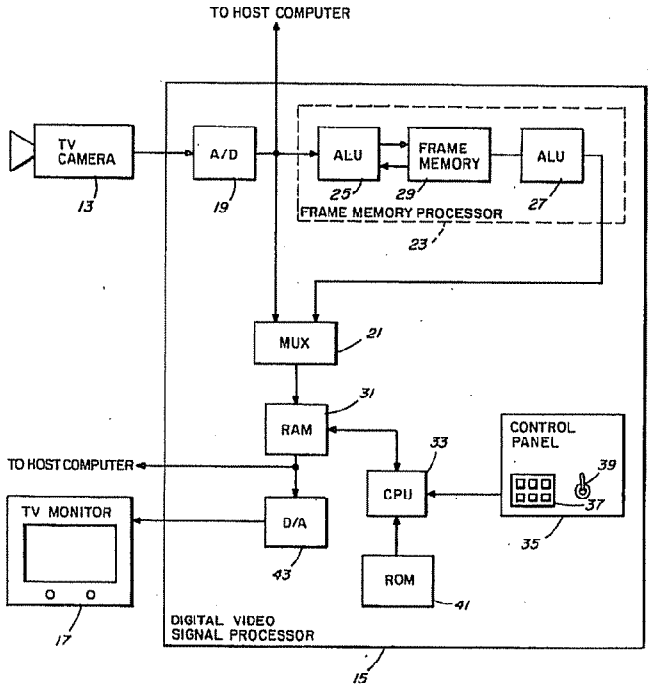
3,800,078	3/1974	Cochran et al.	358/166 X
4,148,070	4/1979	Taylor	358/160
4,242,707	12/1980	Budai	358/160
4,335,427	6/1982	Hunt et al.	358/166 X

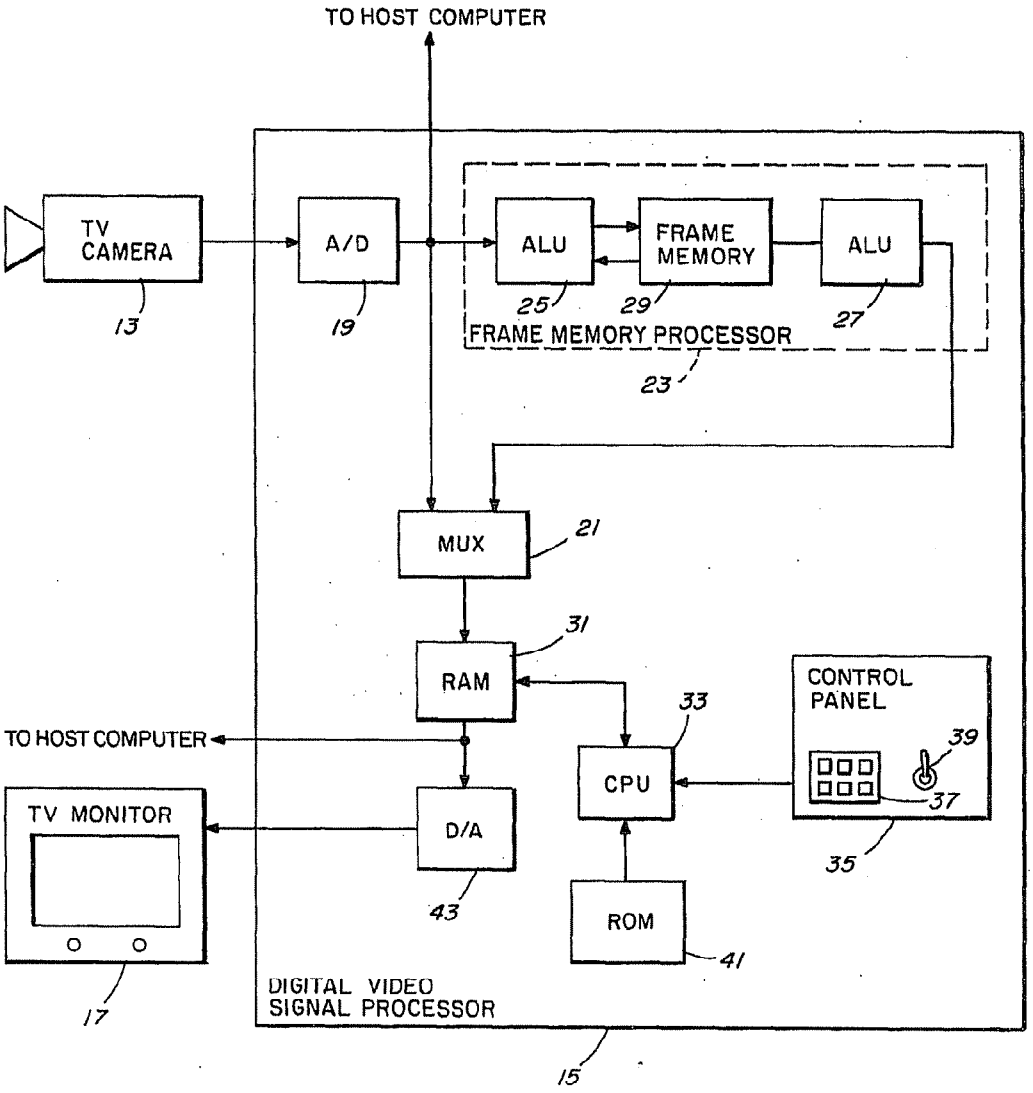
Primary Examiner—Robert L. Richardson
Attorney, Agent, or Firm—Irving M. Kriegsman

[57] **ABSTRACT**

A video system having a television camera, a digital video signal processor coupled to the output of the television camera and a television monitor coupled to the output of the digital video signal processor is disclosed. The digital video signal processor includes an analog to digital converter for converting analog video signals into video data, a frame memory processor for processing and temporarily storing the video data, a random access memory device in which the video data is altered in accordance with the contents of a table-look-up temporarily written therein, a read only memory device containing a plurality of different table-look-ups, each table-look-up containing data representing a different gamma correction, a central processing unit for obtaining a table-look-up from the read only memory device and then writing the table-look-up into the random access memory device and a manually operated control device coupled to the central processing unit for selecting which table-look-up is read out from the read only memory device and then written into the random access memory device and a digital to analog converter for converting the processed video data into analog video signals.

9 Claims, 1 Drawing Figure




TO HOST COMPUTER
TV CAMERA
13
A/D
19
ALU
25
FRAME MEMORY
29
ALU
27
FRAME MEMORY PROCESSOR
23
MUX
21
RAM
31
CONTROL PANEL
33
39
37
35
TO HOST COMPUTER
CPU
TV MONITOR
D/A
43
ROM
41
17
DIGITAL VIDEO SIGNAL PROCESSOR
15

VIDEO SYSTEM HAVING AN ADJUSTABLE DIGITAL GAMMA CORRECTION FOR CONTRAST ENHANCEMENT

BACKGROUND OF THE INVENTION

The present invention relates generally to video systems and more particularly to a video system which includes an adjustable digital gamma correction which is used to selectively emphasize or enhance the contrast of a video picture over different regions of interest.

In a television system the relationship between the brightness of a portion of an object and the brightness of the corresponding portion of the image is generally expressed by the formula:

$$y=x^{\gamma}$$

where y is the magnitude of the output signal, x is the magnitude of the input signal and γ is the power, referred to as the gamma, to which x must be raised to be equal to y. In order to determine the overall gamma of a television system, the gamma of the television camera and the gamma of the television monitor or receiver are multiplied together. In an ideal or distortionless system the overall gamma is 1.0. Unfortunately, in most all television cameras the gamma (which is determined by the composition of the photosensitive material in the vidicon) is between around 0.6 to 0.5 while in most all television monitors the gamma (which is determined by the composition of the phosphorescent material in the screen) is designed to be about 2.2. Consequently, the overall gamma is normally not equal to 1.0 and the contrast of the resulting image is somewhat distorted (i.e. in certain areas the contrast is greater than it should appear and in other areas the contrast is less than it should appear).

In order to correct for this distortion, a type of analog electrical circuit called a gamma correction circuit is normally incorporated into the system. The circuit provides a gamma which when multiplied together with the gamma of the television camera and the gamma of the television monitor produces an overall gamma in the system of around 1.0. These gamma correction circuits are normally built into the television camera or a control module for the television camera and are usually adjustable within a small range, such as from 0.85 to 1.0, to compensate for variations that may be present in the gamma of the particular vidicon tube used in the television camera. Once set to the particular value needed to produce an overall gamma of 1.0 (or as close to 1.0 as is possible), the gamma of the gamma correction circuit is generally not changed. However, in some closed circuit television systems used for surveillance purposes it is known to provide a knob or other manually adjustable means at the television monitor for adjusting the gamma produced by the gamma correction circuit for the purpose of intentionally distorting the contrast over areas of interest where the lighting is poor and the resulting image difficult to perceive. The amount of intentional distortion that can be produced, however, is limited to the small range of adjustability in the analog gamma correction circuit.

It is known to intentionally distort the contrast of an image formed in video microscope systems used in industrial and research applications to examine characteristics and properties of very small objects in order to improve the visibility of the objects being examined by selectively manipulating the gain and offset knobs in the video camera and the diaphragm and compensator settings in the microscope. An example of this technique of contrast enhancement may be found in a publication entitled Video-Enhanced Contrast Polarization (AVEC-POL) Microscopy appearing in Cell Motility 1:275–289 (1981), Alan R. Liss, Inc.

It is also known to convert analog video signals into video data for temporary or permanent storage and/or digital signal image processing. One known type of digital signal image processing that is often performed to improve the quality of an image is noise reduction. An example of a known digital type image processing system may be found in U.S. Pat. No. 4,240,113, to Michael et al. Another example of a digital image processing system is described in Hamamatsu Systems Inc. Product Bulletin/2001 Rev. 2 2-81.

It is an object of this invention to provide a new and improved video system which is especially suited for use in, but not exclusively limited to, industrial and research applications.

It is another object of this invention to provide a novel method and system for selectively manipulating the contrast of a video image.

It is a further object of this invention to provide a video system having an adjustable digital gamma correction.

It is yet still another object of this invention to provide a novel method and system for selectively manipulating the contrast of a video image over low intensity areas.

It is a further object of this invention to provide a novel method and system for selectively manipulating the contrast of a video image over high intensity areas.

It is yet still another object of this invention to provide a video system in which the gamma is adjustable and useable over a range from 0.1 or lower to 3.0 or higher.

It is another object of this invention to provide a system and method for digitally adjusting the gamma of a video system in order to provide contrast enhancement in selected areas of interest.

SUMMARY OF THE INVENTION

A video system constructed according to the teachings of the present invention includes a television camera, a digital video signal processor coupled to the output of the television camera and a television monitor coupled to the output of the digital video signal processor. The digital video signal processor includes an analog to digital converter for converting analog video signals from the television camera into video data, a random access memory device through which the video data is passed and in which the video data is altered in accordance with the contents of a table-look-up temporarily written therein, a read only memory device containing a plurality of different table-look-ups for use in the random access memory device, each table-look-up containing data representing a different gamma correction, a central processing unit for obtaining a table-look-up from the read only memory device and then writing the table-look-up so obtained into the random access memory device in response to control signals applied thereto, a manually operated control device for applying control signals to the central processing unit for selecting which table-look-up is read out from the read only memory device and then written into the random access memory device and an analog to digital

converter for converting the processed video data into analog video signals. In the operation of the digital video system, the contrast of the video picture appearing the television monitor is adjusted for optimum viewing conditions over an area of interest by changing the particular table-look-up in the random access memory device until the most favorable picture is produced.

The foregoing and other objects as well as many advantages of the invention will appear from the description to follow. In the description, reference is made to the accompanying drawings which form a part thereof, and in which is shown by way of illustrating, specific embodiments for practicing the invention. These embodiments will be described in sufficient detail to enable those skilled in the art to practice the invention, and it is to be understood that other embodiments may be utilized and that structural changes may be made without departing from the scope of the invention. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the present invention is best defined by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings wherein like reference numerals represent like parts, the sole FIGURE is a simplified block diagram of a video system including a digital video signal processor constructed according to the principles of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

Referring now to the drawings, there is illustrated in the sole FIGURE a simplified block diagram of a video system constructed according to the teachings of the present invention and identified generally by reference numeral **11**.

Video system **11** includes a television camera **13** for generating analog video signals of an object or scene (or an optical image of an object or scene such as may be formed by a microscope), a digital video signal processor **15** for digitally processing the video signals obtained from the TV camera **13** and a television monitor **17** for displaying an image of the processed video signals.

The digital video signal processor **15** includes an analog to digital converter **19** for converting the analog video signals from TV camera **13** into video data. The video data from analog to digital converter **19** is transmitted to one of two inputs of a multiplexer **21** and to the input of a frame memory processor **23**. The video data from analog to digital converter **19** may also be transmitted to a host or main computer (not shown) for permanent storage and processing, if desired.

In the frame memory processor **23**, video data of a single frame is temporarily stored and processed either before or after storage. The frame memory processor **23** is shown in the FIGURE as including a pair or arithmetic logic units **25** and **27** and a frame memory **29**. Frame memory processor **23** performs various known arithmetic type video signal processing functions, such as summing, averaging or differencing, the particular construction of frame memory processor **23** to perform these functions for purposes such as noise reduction not being considered a part of the invention and the particular components shown therein being for illustrative purposes only. Frame memory **29** may comprise a pair of Intel chips number 2117. An example of a known frame memory processor capable of performing adding, substracting and averaging type signal processing is described in the above referenced Hamamatsu Systems Inc. Product Bulletin/2001, Revision 2, 2/81. The output of the frame memory processor **23** is transmitted to the other input of multiplexer **21**.

The video data from multiplexer **21**, which is obtained either from analog to digital converter **19** or frame memory processor, is transmitted to a high speed random access memory device **31**, where it is modified by a table-look-up which is temporarily written therein. Random access memory device **31** may comprise a pair of Fairchild chips number 93L422 and conventional associated logic circuitry. Random access memory device **31** is loaded with the table-look-up which is used to modify the video data from a central processing unit (CPU) **33** which controls the overall operations of the digital video signal processor **15** through signals sent over appropriate control lines (not shown). CPU **33** may be, for example, an Intel chip number 8080. The program for operating CPU **33** is stored in a memory (not shown) and instructions for executing the operating program are entered through a manually operated control panel **35** which includes a keyboard **37** and a joystick **39**.

The table-look-up which is sent to random access memory device from CPU **33** is obtained from a bank of different table-look-ups permanently stored in a read only memory device **41** which is coupled to CPU **33**. Each one of the table-look-ups in memory device **41** is for a different gamma correction. For example, there may be a bank of thirty table-look-ups, with each table-look-up having a different gamma correction, the smallest gamma correction table being 0.1 or smaller and the largest gamma correction table being 3.0 or larger. As can be appreciated, if the gamma resulting from TV camera **13** and TV monitor **17** is, for example, 1.32 a set of gamma correction tables having a range of 0.1 to 3.0 will enable the overall gamma to be changed from 0.132 to 3.966. Read only memory device **41** may comprise a pair of Intel chips number 2716 and associated logic circuitry.

The modified output data from random access memory device **31** is fed into a digital to analog converter **43** where it is converted into analog video signals. The modified output data may also be sent to the host computer, if desired. The image corresponding to the video output signals from digital to analog converter **43** is displayed on TV monitor **17**.

In the operation of the digital video signal processor **15**, the particular table-look-up that is read out from the read only memory device **41** and written into the random access memory is controlled through the manually operated control panel **35**. For example, the CPU **33** may be programmed so that the specific table-look-up written into the random access memory **31** from the read only memory **41** is determined by the angular position of the joy stick **39**. Alternatively CPU **33** may be programmed so that different look-up-tables can be moved from read only memory **41** to random access memory **31** by depressing different keys or combinations of keys on the keyboard **37**. As can be appreciated, the gamma correction applied to the video data can thus be very easily and very quickly changed over a range limited solely the number of different tables stored in the read only memory device **41** and the gamma values preselected for the individual tables.

In using the digital video signal processor **15** to manipulate contrast, data sent to multiplexer **21** either

directly from analog to digital converter **19** or from frame memory processor **23** is fed from multiplexer **21** into random access memory **31**, the particular data selected being controlled by CPU **33**. The gamma correction table inserted into random access memory device **31** is than changed until the most favorable image is formed on the screen of the TV monitor **17**. By changing the gamma correction over a portion of or over the entire range of table-look-ups, areas of interest in the resulting picture may be seen which might not otherwise be visually perceptible.

As is known, for certain applications such as viewing video pictures of X-rays, it is benefical to emphase contrast in low intensity areas while in other applications such as in video microscopy it is beneficial to emphasize contrast in high intensity areas. Thus, in certain instances low gamma corrections are desirable while in other instances high gamma corrections are desirable.

As is also known, at very high or very low gammas, noise represents a problem that can very adversely effect the resulting picture. However, by processing the video data through frame memory processor **23**, the noise can be easily reduced or substantially eliminated. Therefore, when using very high or very low gammas, the video data should be processed for noise reduction in the frame memory processor **23**.

The above description is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed is:

1. A video system comprising a television camera for converting visual information into analog video signals, a digital video signal processor for digitally processing said anolog video signals and a television monitor for displaying an image of the processed analog video signals, said digital video signal processor including:

a. an analog to digital converter for converting the analog video signals into video data,

b. a first memory device for modifying the video data according to the particular contents contained therein,

c. a second memory device, said second memory device having stored therein a plurality of table-look-ups, each table-look-up corresponding to a different gamma correction,

d. a central processing unit for controlling the operations of the digital video signal processor, said operations including reading out one of said table-look-ups in said second memory device and writing said read data into said first memory device,

e. a manually operated control device for controlling the operations of the central processing unit, said control device including means for selecting the particular table-look-ups to be read by said central processing unit, and

f. a digital to analog converter for converting the modified video data from said first memory device into analog video signals.

2. The video system of claim **1** and wherein said first memory device comprises a pair of high speed RAMS.

3. The video system of claim **1** and further including a frame memory processor for processing and/or storing a single frame.

4. The video system of claim **1** and wherein the means for selecting the particular table-look-up to be read by the central processing unit comprises a joystick.

5. A method of manipulating video picture data for the purpose of enhancing contrast over certain areas of interest comprising:

a. passing said video picture data through a first memory device which is arranged to modify the video picture data according to the contents of a table-look-up contained therein,

b. providing a second memory device having therein a plurality of different table-look-ups, each table-look-up corresponding to a different gamma correction, and

c. selectively reading out one of said table-look-ups from said second memory device and writing said table-look-up so read into said first memory device.

6. A digital video signal processor for processing analog video signals comprising:

a. an analog to digital converter for converting the analog video signals into video data,

b. a first memory device for modifying the video data according to the particular contents contained therein,

c. a second memory device having therein a plurality of table-look-ups, each table-look-up constituting a different gamma correction,

d. a central processing unit for moving one of the table-look-ups from the second memory device to the first memory device and

e. control means for selecting which table-look-up is moved from the second memory device to the first memory device.

7. A digital video signal processor according to claim **6** and wherein said first memory device comprises a pair of high speed RAMS.

8. A digital video signal processor according to claim **6** and wherein including a frame memory processor for processing and/or storing a single frame.

9. A digital video signal processor according to claim **6** and wherein the means for selecting the particular table-look-up to be read by the central processing unit comprises a joystick.

* * * * *